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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,673	01/26/2004	Doron Meshulach	8935 USA/PDC/PDC	9888

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EXAMINER	
SULLIVAN, CALEEN O	
ART UNIT	**PAPER NUMBER**
1756	

MAIL DATE	DELIVERY MODE
06/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/765,673	MESHULACH, DORON	
	Examiner	Art Unit	
	Caleen O. Sullivan	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *10-18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06/29/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-9, drawn to a method of printing a pattern, classified in class 430, subclass 311.

II. Claims 10-18, drawn to a system for printing a pattern, classified in class 355, subclass 69.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process such a method of forming an image by laser microscopy.

3. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art due to their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Attorney Tarek N. Fahmi on 05/31/2007 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-9. Affirmation of this election must be made by applicant in replying to this Office action. Claims 10-18 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Norimasa.

Norimasa discloses a method of patterning optical recording medium layer that is comprised of a photosensitive material. (See, abstract). Norimasa discloses that an optical recording layer (3) that comprises photosensitive material, a wavelength changing layer (4) that comprises a non-linear optical material, such as beta-barium borate, as well as a light absorbing layer (5) and a protective layer, if necessary, are formed on a supporting substrate (2). (See, abstract). The nonlinear optical material induces the second or third nonlinear polarization on the inside therein to emit light having a wavelength that is ½ or 1/3 that of the incident light. (See, abstract).

Norimasa also discloses that the optical absorption layer contains the wavelength band of the photosensitive material, which comprises the photo-recording layer, in it absorption wavelength band; however, the optical absorption layer does not contain the wavelength band of the incident light. (See, abstract). Norimasa discloses that the method allows the use of laser light, which decreases the cost of reproducing the optical recording medium, which can also be made in a small size. (See, abstract).

Norimasa discloses all the limitations of claims 1 and 4.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 2-3 and 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norimasa in view of Tsang. Norimasa is relied upon as discussed in the rejection of claims 1 and 4. However Norimasa fails to explicitly disclose the limitations of claim 2, where the at least one beam of radiation is focused onto the intermediate layer and the limitation of claim 3 where the beam of fundamental frequency is substantially located at an interface defined by the medium and the intermediate layer. Norimasa also fails to disclose the limitation of claims 5 where the beam of fundamental frequency is characterized by a short duration or the limitation of claim 6 her the beam of fundamental radiation is characterized by high intensity. Norimasa further fails to disclose the limitation of claim 7, where the fundamental frequency is within the UV or EUV spectral range. Norimasa neither discloses a step where at least two beams of fundamental frequency were directed simultaneously towards at least two locations of the intermediate layer nor does Norimasa disclose that the $X^{(3)}$ of the medium differs from the $X^{(3)}$ of the intermediate layer. However, Tsang discloses such limitations.

Tsang discloses optical third-harmonic generation at interfaces. Tsang discloses that when using a focused high-intensity ultra-short lasers pulses, which meets the limitation of claims 5 and 6, normally weak THG process becomes highly operable at a simple air-dielectric interface (See, abstract). In particular, in the experiments discloses, Tsang uses a femto-second laser oscillator that focuses on the interface between two different lossless materials, which meets the limitation of claims 2 and 3, from which a strong THG signal is obtained. (See, pg. 4116). Tsang discloses that this enhancement of the THG signal at the interface of the materials is analogous to the well-known SHG and is highly localized at the interface of the materials. (See, pg. 4116).

Tsang further discloses that high-order harmonic generation at an interface of two different non-absorbing dielectric media using a focused beam is a fundamental physical process and is a universal nonlinear optical property of interfaces. (See, pg. 4116). Tsang also discloses an experiment where third harmonic radiation is generated at an interface of differing materials. In one example Tsang uses a multiple layered system, consisting of multiple dielectric layers. (See, pg. 4123). In particular the layered dielectric mirror consisted of about 13 stacks of high-low index structures made of HfO2 and a SiO2. (See, pg. 4123).

In the example Tsang discloses that a fundamental beam is focused on the dielectric stack and the THG at every interface, of air and the dielectric material, is either transmitted or reflected. (See, pg. 4123). Tsang further discloses that the THG wavelength is 258nm and the fundamental beam has a wavelength of 775nm, which meets the limitation of claim 7. (See, pg. 4123). Tsang also discloses that the $X^{(3)}$ of surface of the material layer as compared to $X^{(3)}$ of air, is generally 10^6 larger, which meets the limitation of claim 9. (See, pg. 4124). Tsang also includes example experiments where THG is formed at the interface of air and a material such as beta-barium borate

crystal, which Norimasa discloses can be used as the wavelength changing material in the process of patterning the photosensitive optical recording medium layer.

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to modify the teachings of Norimasa with the teachings of Tsang because Tsang discloses that third harmonic radiation is generated at an interface between differing materials, when a fundamental beam is focused on the interface between air, as a medium, and a material layer and this radiation that is generated is propagated through the material layer.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caleen O. Sullivan whose telephone number is 571-272-6569. The examiner can normally be reached Monday-Friday, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/COS/, 06/05/07

MARK F. HUFF
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